What is claimed is:

1. A method of determining at least one parameter of a radiating source, based on a plurality of spatial positions of an antenna array and relational phases between signals generated by the radiating source in first and second antenna elements of the antenna array at said plurality of spatial positions, the method comprising the steps of:

for each potential value of said at least one parameter, predicting a set of corresponding spatial positions and relational phases;

moving the antenna array through said plurality of spatial positions;

while moving the antenna array, measuring actual relational phases at each of said plurality of spatial positions to generate a set of measured spatial positions and relational phases;

comparing the measured set with each of the predicted sets to find a best-matching predicted set; and

determining an actual value of said at least one parameter based on the best-matching predicted set.

2. The method of claim 1, further comprising the step of reporting presence of said radiating source upon detecting a predicted set satisfying a best-matching condition.

3. The method of claim 2, further comprising the step of reporting presence of multiple radiating sources upon detecting multiple predicted sets satisfying the best-match condition.

4. The method of claim 1, wherein the antenna array rotates through said plurality of spatial positions with a boresight direction of the antenna array remaining coplanar and sweeping out an angular arc during said rotating.

5. The method of claim 1, wherein the antenna array rotates through said plurality of spatial positions with a boresight direction of the antenna array sweeping out a conical surface during said rotating.

6. A method of determining a parameter of at least one radiating source using an antenna array having first and second antenna elements, comprising the steps of:

a) when the antenna array is set at a particular angular position, predicting, for each potential value of said parameter, a relational phase that would be generated between signals induced by any of said at least one radiating source in the first and second antenna elements;

b) storing the predicted relational phases in a plurality of memory cells each being associated with a potential value of said parameter;

c) starting from a beginning angular position, rotating the antenna array for an angular interval;

d) shifting contents of the memory cells corresponding to said angular interval;

e) measuring an actual relational phase between signals induced in the first and second antenna elements;

f) matching the actual relational phase with the content of each of the memory cells;

g) repeating steps (c), (d), (e), and (f) while accumulating a number of matches for each of the memory cells, until the antenna array has reached an ending angular positions;

h) evaluating the number of matches of each of the memory cells against a criterion; and

i) outputting the potential value or values associated with those of the memory cells that satisfies the criterion as actual value or values of said parameter of said at least one radiating source.

7. The method of claim 6, wherein said parameter comprises an azimuth angle of a direction of propagation of radiation, transmitted by said at least one radiating source toward the antenna array, with respect to an azimuth plane of the antenna array.

8. The method of claim 7, wherein the first and second antenna elements are located and rotated in the azimuth plane.

9. The method of claim 7, further comprising the step of determining either of a radiation frequency of said at least one radiating source and an elevation angle of the direction of propagation with respect to the azimuth plane of the antenna array.

10. The method of claim 5, wherein the beginning and ending angular positions spaced from about 60 to about 90 degrees.

11. The method of claim 5, wherein said at least one radiating source is swept over by the antenna array during the movement thereof from the beginning angular position to the ending angular position.

12. The method of claim 5, wherein said particular angular position is a zero degree position.

13. A directional correlation system, comprising:

an antenna array having at least one baseline provided with first and second antenna elements;

a steering mechanism for moving the antenna array;

a receiver coupled to the baseline for receiving signals induced in the first and second antenna elements, and measuring a relational phase therebetween;

a memory for storing predicted relational phases that are expected to be found in the baseline when the antenna array is set at a particular angular position and a wave-front is incident to the antenna array at an azimuth angle with respect to an azimuth plane of the antenna array, the predicted relational phases being stored in a plurality of memory cells each being associated with a potential value of said azimuth angle;

an encoder coupled to said steering mechanism and said memory, for shifting contents of the memory cells corresponding to the movement of the antenna array;

a set of comparators each being coupled to an output of said receiver and accessing a selected of the memory cells for matching the measured relational phase fed by said receiver with the content of the selected memory cell;

a set of counters each being coupled to an output of one of said comparators for accumulating a number of matches for the respective memory cell during the movement of the antenna array; and

a threshold detector coupled to outputs of said counters for determining the memory cell or cells the content of which matches best with the measured relational phase during the movement of the antenna array, thereby determining a direction of arrival of said wave-front.

14. The system of claim 13, further comprising a digitizer for digitizing the measured relational phase and feeding the digitized relational phase to said comparators.

15. The system of claim 13, further comprising a blocking circuit for disabling the outputs of those of said comparators where matches are found, until the contents of the memory cells has been shifted corresponding to the movement of the antenna array.

16. The system of claim 13, wherein said memory comprises a shift register.

17. The system of claim 13, wherein said memory and comparators comprise multi-bit devices.

18. The system of claim 13, wherein when the antenna array rotates for an angular interval, said encoder shifts the contents of the memory cells for a number of cells corresponding to said angular interval.

19. The system of claim 13, wherein the antenna array comprises more than one baseline and the system further comprises, for each additional baseline,

an additional receiver coupled to the additional baseline for measuring a relational phase in the additional baseline;

an additional memory for storing additional predicted relational phases that are expected to be found in the additional baseline when the antenna array is set at an additional particular angular position and said wave-front is incident to the antenna array, the predicted relational phases being stored in a plurality of additional memory cells of said additional memory, each additional memory cell being associated with a potential value of said azimuth angle; and

an additional set of comparators each being coupled to an output of said additional receiver and accessing a selected of the additional memory cells for matching the measured additional relational phase fed by said additional receiver with the content of the selected additional memory cell.

20. The system of claim 19, wherein each of said counters is further coupled to an output of a respective additional comparator for incrementing the number of matches only when both the respective comparator and the respective additional comparator return matched signals at their outputs.

21. The system of claim 19, wherein the baselines have different lengths and are not co-linear.

22. The system of claim 13, wherein the antenna array comprises two baselines in a V-shaped arrangement, a length ratio of the baselines is between 1 and 2, and an angle between the baselines is from about 40 to about 70 degrees.

23. The system of claim 13, further comprising a circuit for calculating one of frequency of the wave-front and an elevation angle thereof with respect to the azimuth plane of the antenna array.

24. The system of claim 13, wherein said steering mechanism is configured to rotate the baseline in a conical surface section.

25. The system of claim 24, wherein the predicted relational phases are analytically calculated taking into account azimuth and elevation angles of the baseline with respect to the azimuth plane of the antenna array during the rotation in the conical surface section.

26. The system of claim 24, further comprising a circuit for calculating both frequency of the wave-front and an elevation angle thereof with respect to the azimuth plane of the antenna array.

27. A multi-directional correlation system for simultaneously determining at least first and second parameters of a wave front, said multi-directional correlation system comprising:

an antenna array having at least one baseline provided with first and second antenna elements;

a steering mechanism for moving the antenna array;

an encoder coupled to said steering mechanism;

a receiver coupled to the baseline for receiving signals induced by the wave-front in the first and second antenna elements, and measuring a relational phase therebetween; and

at least one column of correlators, each correlator being associated with a potential value of the second parameter and comprising:

a memory for storing predicted relational phases that are expected to be found in the baseline when the antenna array is set at a particular angular position, the predicted relational phases being stored in a plurality of memory cells each being associated with a potential value of the first parameter, said encoder being further coupled to said memory for shifting contents of the memory cells corresponding to the movement of the antenna array;

a set of comparators each being coupled to an output of said receiver and accessing a selected of the memory cells for matching the measured relational phase fed by said receiver with the content of the selected memory cell; and

a set of counters each being coupled to an output of one of said comparators for counting a number of matches for the respective memory cell during the movement of the antenna array;

said multi-directional correlation system further comprising a threshold detector coupled to outputs of said counters of each of said correlators for determining the memory cell and the respective correlator thereof which has the number of matches satisfies a predetermined criterion, and outputting the potential values associated with the determined memory cell and respective correlator as actual values of the first and second parameters, respectively.

28. The multi-directional correlation system of claim 27, wherein the first parameter is an azimuth angle, at which the wave-front is incident to the antenna array, with respect to an azimuth plane of the antenna array.

29. The multi-directional correlation system of claim 27, wherein each of said correlators further comprises a blocking circuit for disabling the outputs of those of said comparators where matches are found, until the contents of the memory cells has been shifted corresponding to the movement of the antenna array.

30. The multi-directional correlation system of claim 27, wherein when the antenna array rotates for an angular interval, said encoder shifts the contents of the memory cells of each of said correlators for a number of cells corresponding to said angular interval.

31. The multi-directional correlation system of claim 27, further comprising a plurality of said columns of correlators to form an array of correlators, each of said columns of correlators being associated with a potential value of a third parameter of the wave-front, whereby actual values of the first, second and third parameters can be simultaneously determined during the movement of the antenna array.

32. The multi-directional correlation system of claim 31, wherein the first, second and third parameters of the wave-front includes azimuth and elevation angles of an incident direction of the wave-front with respect to an azimuth plane of the antenna array, and a wavelength of the wave-front, respectively.

33. The multi-directional correlation system of claim 31, wherein the movement of the antenna array is three dimensional movement.